margin of eye; no barbels. Scales 35–38 $\frac{5\frac{1}{2}-6}{8-9}$, $5\frac{1}{2}$ or 6 between lateral line and root of ventral. Dorsal II 14–15, originating at a point equidistant from tip of snout and base of caudal; anterior branched rays as long as the head. Anal II 14–15. Pectoral nearly as long as the head, extending to the root of the ventral. Ventral 8-rayed, a little shorter than the pectoral, extending a little beyond the origin of anal. Caudal deeply forked. Caudal peduncle longer than deep. Olivaceous above, silvery below; lower parts of abdomen blackish; vertical fins dusky, the dorsal and caudal with some dark spots on the rays, the anal with a blackish edge; ventral blackish, with the outermost ray white.

Four specimens, 62 to 78 mm. in total length, from the Yamasabu River, Lake Biwa.

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## BIBLIOGRAPHICAL NOTICE.

*Memoirs of the Geological Survey of India.—Palæontologia Indica.* Series XV. *Himalayan Fossils.* Vol. IV. *The Fauna of the Spiti Shales.* By Dr. Victor Uhlig, Professor of Geology in the University of Vienna. 132 pages, 18 plates, and 10 text-cuts. Folio. 1904. Geol. Surv. Office, Calcutta; Kegan Paul & Co., London; and Friedländer, Berlin.

The important fossiliferous strata which constitute the basis of this elaborate and well-illustrated Monograph by Dr. Victor Uhlig, of Vienna, are met with in limited areas among the much denuded rocks of the Central Himalaya, especially in the Spiti Valley, latitude N. 32° 5′, longitude E. 78° 15′, and lat. N. 28° 51′, long. E. 77° 36′. The beds consist of dark grey and black shales, 300 feet thick, lying over a limestone and under a sandstone. The former (part of the Lower Gondwána system) is referred to the Jurassic epoch, and the latter or Giusmal Sandstone (600 feet thick) belongs to the Upper Gondwána and is referred to the Neocomian. The relative age of the "Spiti Fossils" has been the subject of much controversy, and several eminent palæontologists have assisted the Geological Survey of India in this investigation with both head and hand.

In the Introduction Dr. Uhlig makes careful mention of the many geologists who have advanced our knowledge, special and general, of the Spiti Fauna through the clouds of doubt and difficulties encountered in former days; and he gratefully thanks his fellow-workers and friends in India, Europe, and Britain, by whose help this comprehensive and really valuable memoir has been perfected and published. The talented artists and the friendly translator of his MS. are especially thanked. Indeed everybody who has been engaged in this good work has to be congratulated on the complete success of their labours.

The description of the species occupies pages 4 to 132, and in the Introduction (p. 3) this is apparently referred to as Part I. of the work, the notes on the natural history of the fossils, their relationships, stratigraphical position, and discovery being intended for Part II., but these particulars appear to have been incorporated with the description of each species.

In his systematic treatment of the species of Ammonites from the Spiti strata, Dr. Uhlig introduces the *Ammonidea* (p. 4) by carefully explaining that, not binding himself to the modern definition of the genera, he draws up the description of each of the forms with extreme minuteness, and indicates its "apparent position in the most generally accepted system." Thus he prefixes his view of the generic characters at the commencement of the account given of each group of species.

The classification of the species can be casually seen in the several tabular lists at pages 77, 82, 83, 89, 93, 95, 96, 98, 99, 101, 102, 106, 107, 110, 112, 114, 115, 117, 119, 121, 122, 124, 126, 127, 129, 130. The reference-numbers here annexed to the species, which are arranged according to their natural affinities, will be of some use to student and reader, especially as there is no Index issued with this edition of the Memoir.

The following and some other Ammonites (see pages 107–111, 112–118, 119–125, 126–130, 130–132; and the table, *infrà*, page 368) from the Spiti beds are described, besides those mentioned at pages 4 to 74 :—

AMMONIDEA.

PHYLLOCERAS, *Suess*, p. 4.
- plicatum, sp. nov., p. 4.
- strigile, *Blanford*, sp., p. 6.

LYTOCERAS, *Suess*, p. 8.
- exoticum, *Oppel*, sp., p. 14.

HOPLOCERAS, *Zittel*, p. 18.
- Dieneri, sp. nov., p. 19.
- indicum, sp. nov., p. 21.

HECTICOCERAS, *Bonarelli*, p. 23.
- Kobelli, *Oppel*, sp., p. 25.
- latistrigatum, sp. nov., p. 27.
- sp. nov. indet., p. 29.

OPPELIA, *Waagner*, p. 30.

The *Oppeliæ* of the Spiti fauna are classified in four groups according to their lobal structure, as below. It is noted by the author that "the name *Oppelia* (sensu stricto) should be reserved for the group of *subradiata*, as Waagner, in establishing the genus, had that group of forms above all in his mind." The generic aspect is that of a smooth or feebly costate discoidal Ammonite.

I. Group of *Oppelia Adolphi*, Oppel, p. 31 (*Ammonites pictus*, Quenstedt; Group of the *Tenuilobata*, Oppel; *Streblites*, Hyatt), represented by the under-mentioned forms :—

| | | | Page |
|---|---|---|---|
| Oppelia (Streblites) | | Adolphi, *Opp.* | 42 |
| „ | „ | Kraffti, sp. nov. | 44 |
| „ | „ | Griesbachi, sp. nov. | 47 |
| „ | „ | planopicta, sp. nov. | 47 |
| „ | „ | sp. nov. indet. | 50 |
| „ | „ | indopicta, sp. nov. | 52 |
| „ | „ | himalayana, sp. nov. | 51 |
| „ | „ | substriata, *Oppel*, sp. | 54 |
| „ | „ | Lymani, *Oppel*, sp. | 56 |

The *Adolphi* group are closely connected with the European *Tenuilobata* by their concordance of the lobal structure, ornamentation, external shape of the test, development of the carina, and the form of the body-chamber.

II. Group of *Oppelia acucincta* (*Oppelia*, sensu stricto), represented by only one species: *Oppelia acucincta*, Strachey, sp. (p. 40).

III. Group of *Oppelia nivalis* (*Neumayria*, Bayle), represented by only one species: *Oppelia* (*Neumayria*) *nivalis*, Stoliczka, sp. (p. 41).

IV. Group of *Oppelia* (*Œotraustes*) *adela*, represented by only one species: *Oppelia* (*Œotraustes*) *adela*, sp. nov. (p. 41).

In comparing the Spiti *Tenuilobata* with the European, Dr. Uhlig finds (pp. 37–38) that the former group had multifarious ramifications very partially known to us, while in Europe the group is also manifold, but more closely knit, and there are some analogies and some divergent characters; these two geographically distinct series do not appear to have followed a similar and quite parallel course of evolution, but were affected "by partial and provincial tendencies to mutation, and admitted, even along the same lines of mutation, of the development of vicarial forms (as, for example, *Opp. indopicta* and *Frotho*)." It is not necessary to ask for a land-barrier to account for this isolation, for a wide range of ocean may well be occupied by various and different creatures. It is thought possible, however, that one at least of the Cutch (Katrol) Ammonites (*Opp. plicodiscus*, Waagner) might serve as an intermediate.

Following the genus *Oppelia* comes the genus *Aspidoceras*, Zittel (pp. 74, 75), represented by *Aspidoceras avellanoides*, sp. nov., founded on a specimen regarded by Stoliczka, in 1865, as *Ammonites liparus*, Oppel, and proved on re-examination to be *Aspidoceras* of the *Inflati* group *Physodoceras*, Hyatt).

The genus *Holostephanus*, Neumayr, is recorded next to *Aspidoceras* in order (page 77). In external form it has a thick and costate shell, tuberculate along the umbilical border. It is divisible into several groups, one of which has a single representative in the Spiti Shales (*H. Schenki*), while the other groups "exhibit an unexampled variety of forms." The alliances of some of these have been very differently regarded by different writers. Taking *Holostephanus spitiensis* (Blanford) as the type of a new subgenus (*Spiticeras*, pp. 77 & 82), Dr. Uhlig describes it carefully, and defines its species in the following order: —

I. Forms with a broad saddle and slightly pendent, feebly developed, auxiliary lobes.

(*a*) Forms of larger growth.



(*b*) Forms of medium and smaller growth.



II. Forms with narrow slashed saddles and deeply pendent, strongly developed, auxiliary lobes.

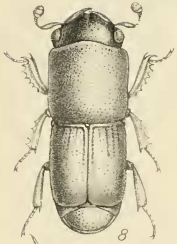


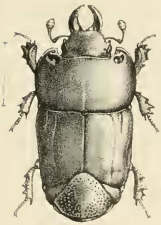
III. Isolated and extreme forms.

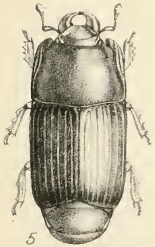


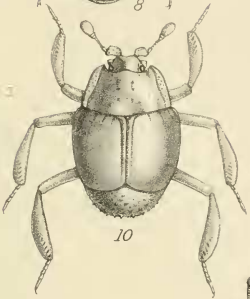
The "important and oft-quoted" *Holostephanus* (*Astieria*) *Schenki*, Oppel, sp., is refigured and described anew from Oppel's restoration of the Tobeta specimen, and another fragment is mentioned (pages 130–132). Some observations are made on the standing of the species among its allies, also on the relationship of some South-African Ammonites to one of the groups of *Holostephanus*.

Besides the shape and ornamentation of the shell and the peculiarities of the septa, the naturalist has to note their successional features (due to phases of growth), in establishing specific and other divisions in Ammonites. In estimating the relative value of their many features and characters, Dr. Uhlig finds breaks and puzzling contrasts, and it will be quite possible that other Cephalopodists, following their own views of the relative value of the evidence, may be unable to accept the classification proposed in this Monograph, but at all events they will highly appreciate the value of its great store of illustrated information, so carefully collected and systematically arranged.

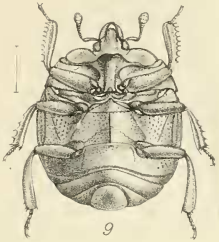


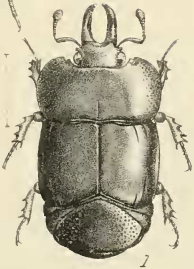



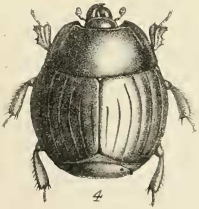


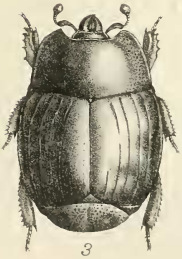









H. Knight ad nat lith

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